

Ch. 29

CQ: 8

P: 14, 18, 38

29.P.14

$$V = 100x^2 \text{ V}$$

E_x at $x=0\text{m}$, $x=1\text{m}$

$$E_x = -\frac{dV}{dx}$$

$$E(0) = 0 \text{ V/m}$$

$$E(1) = -200 \text{ V/m}$$

$$-\frac{dV}{dx} = 200x = -200x$$

$$\begin{aligned} x=0\text{m}, E &= 0 \text{ V/m} \\ x=1\text{m}, E &= -200 \text{ V/m} \end{aligned}$$

29.P.18

100 pF

$L \times L$ metal, L ?

Spacers $2.0 \times 10^{-4} \text{ m}$ thick

$$C = \frac{\epsilon_0 A}{d}$$

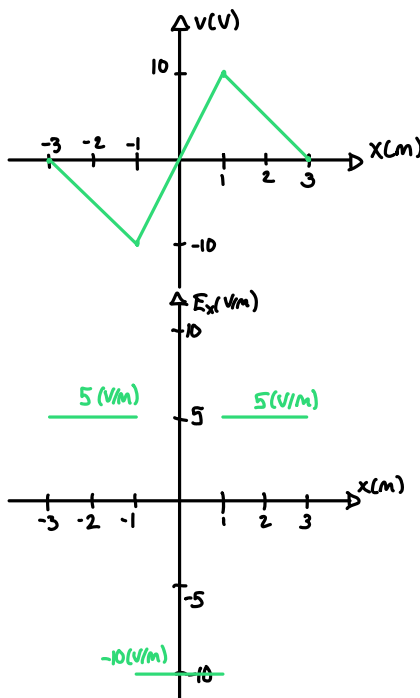
$$A = \frac{Cd}{\epsilon_0}$$

$$A = 0.00226 \text{ m}^2$$

$$L = 0.0475 \text{ m}$$

$$L = 4.75 \times 10^{-2} \text{ m}$$

29.P.38



$$\Delta V: -3 \leq x \leq -1 \text{ m}$$

$$\Delta V = -5x$$

$$E_x = -\frac{dV}{dx}$$

$$E_x = 5 \text{ V/m}$$

$$\Delta V: -1 \leq x \leq 1 \text{ m}$$

$$\Delta V = 10x$$

$$E_x = -10 \text{ V/m}$$

$$\Delta V: 1 \leq x \leq 3 \text{ m}$$

$$\Delta V = -5x$$

$$E_x = 5 \text{ V/m}$$

29.CQ.8

a.) $V_1 = V_2$, Potential is equal across the two spheres since they are both connected.

b.) The charge on S_1 is greater than on S_2 due to $r_1 > r_2$. $Q_1 > Q_2$

c.) $E_2 > E_1$ since the radius is smaller in Sphere 2.